

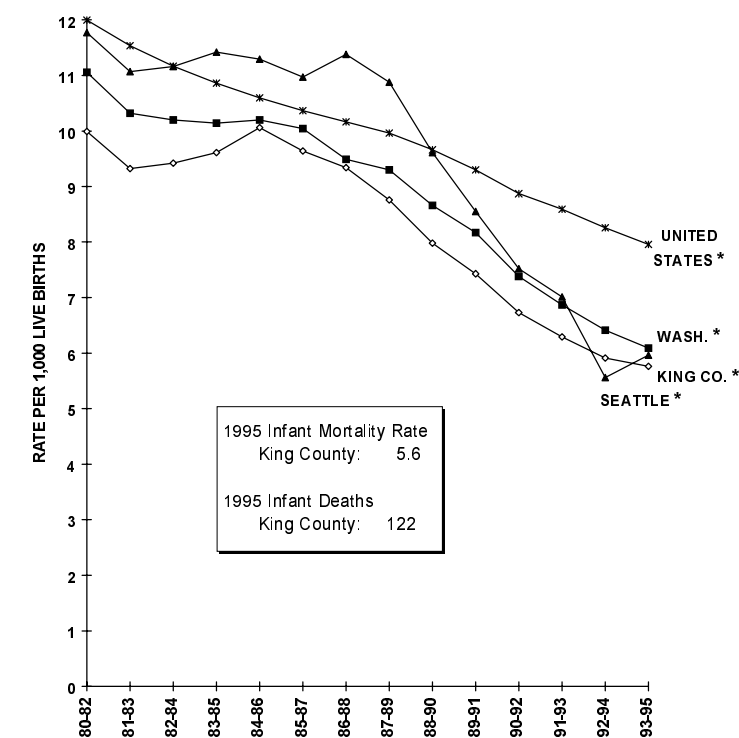
CHAPTER II: TRENDS IN INFANT MORTALITY

In this chapter, we describe the overall trends in infant mortality, specific causes of infant deaths, and risk factors for infant death in King County.

1. TRENDS IN INFANT MORTALITY FOR UNITED STATES, WASHINGTON, KING COUNTY, SEATTLE

The infant mortality rate in King County in 1995 (the most recent year for which data are available) was 5.6 deaths per 1000 live births as compared to 4.9 for King County outside Seattle, 7.2 for Seattle, 5.8 for Washington state, and 7.6 for the United States. The total number of infants who died in King County in 1995 was 122: 45 infants within Seattle and 75 infants in King County outside of Seattle, with 2 in an unknown area.

**FIGURE 2.1: INFANT MORTALITY RATE
U.S., WASHINGTON, KING COUNTY, SEATTLE
THREE YEAR ROLLING AVERAGES, 1980-1995**



* TRENDS FROM 1988-1995 SHOW A STATISTICALLY SIGNIFICANT DECREASE.
SOURCE: BIRTH AND DEATH CERTIFICATES.

Figure 2.1 displays trends over time in the infant mortality rate using three year rolling averages. The average rate for each three year period is shown to smooth out the random and non-significant year-to-year variation in the infant mortality rate. Because the rates are based on a relatively small number of deaths each year, small changes in the number of deaths can lead to large changes in the rates. However, these changes in the rates are not very meaningful. For example, an increase of six deaths in Seattle will increase the rate by approximately 1.0 per 1000 live births. Yet a change of six in the number of deaths is more likely to represent a random fluctuation than a true change.

The rate of infant deaths in King County has continued to decline since 1985, as has the rate in King County outside Seattle since 1987. The rate in Seattle, after declining dramatically from the 1987-1989 period to the 1992-1994

period, appears to have leveled in the

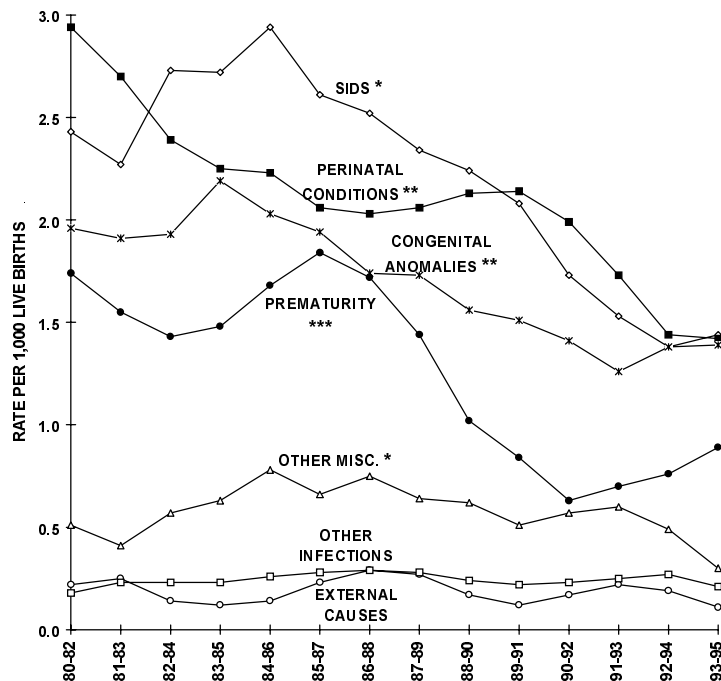
1993-1995 period. However, examination of the rate in future years is required before drawing any conclusions that the declining trend of recent years has ended; the data are consistent with the rate in the 1993-1995 period being a random fluctuation in a generally downward trend. This change in Seattle's infant mortality rate was observed only in the central and southeast portions of the city and is discussed in more detail in Chapter V.

2. TRENDS IN SPECIFIC CAUSES OF INFANT MORTALITY IN KING COUNTY

The infant mortality rate is a summary indicator describing the death rate among infants from all causes of death combined. These causes are quite diverse, and each is associated with its own set of risk factors and prevention strategies. Therefore, it is useful to examine the specific causes in more detail.

Similar to the previous period of 1992-1994, the three leading causes of infant deaths in the 1993-1995 period were SIDS (Sudden Infant Death Syndrome), perinatal conditions (conditions causing death during the first 27 days of life, including lung problems, birth-related injuries, suffocation during birth, and infections), and congenital anomalies (birth defects). Each accounted for slightly less than a quarter of all deaths. Deaths due to prematurity^a also figured prominently and contributed 16 percent of the total. Non-perinatal infections occurring after the perinatal period (such as pneumonia or meningitis), external causes (injuries, both intentional and unintentional), and miscellaneous other causes each represented smaller numbers of cases. Definitions of these causes of death are contained in Chapter I under "How to Read this Report."

**FIGURE 2.2: CAUSES OF INFANT MORTALITY
KING COUNTY
THREE YEAR ROLLING AVERAGES, 1980-1995**



* TRENDS FROM 1984-1995 SHOW A STATISTICALLY SIGNIFICANT DECREASE.
 ** TRENDS FROM 1980-1995 SHOW A STATISTICALLY SIGNIFICANT DECREASE.
 *** TRENDS FROM 1985-1990 SHOW A STATISTICALLY SIGNIFICANT DECREASE.
 SOURCE: BIRTH AND DEATH CERTIFICATES.

Significant decreases in the rates of all four major causes of infant death occurred between 1980 and 1995 (Figure 2.2). Each declined by more than 50 percent from their high points in the 1980s to their low points in the early 1990s. Despite these generally favorable trends, the rate for perinatal conditions has remained relatively stable since 1992.

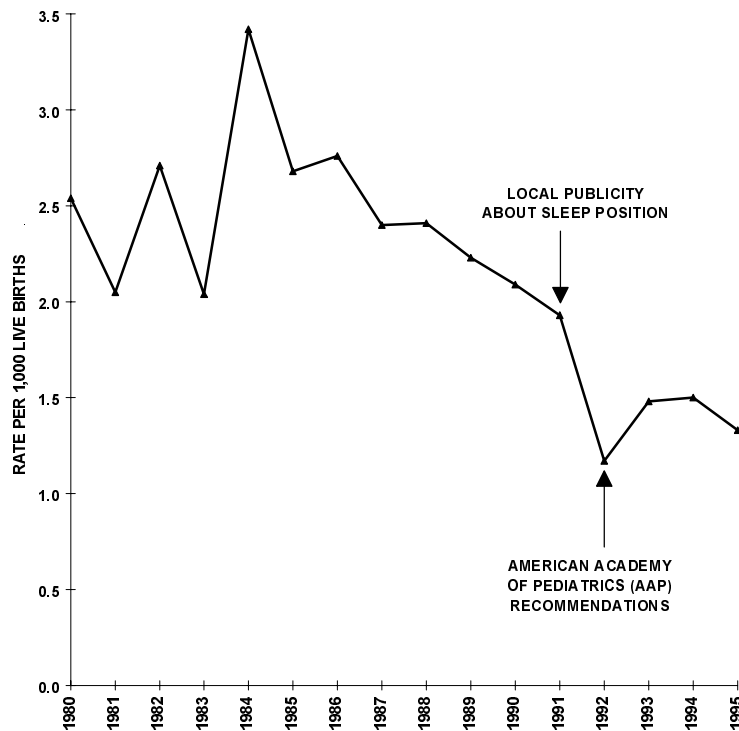
The prematurity death rate has increased since 1990, although the increase is not statistically significant. The increase in prematurity deaths appears to be primarily caused by a recent increase in mortality among infants born with very low-birthweight (<1500 grams or <3.3 pounds).

The death rate due to SIDS declined consistently since the 1985-1987 period; however, the rate appears to have plateaued since 1993 as described in detail on the next page.

The death rate from congenital anomalies appears to have increased since the 1992-1994 period, although non-significantly. Despite the non-significant increase in the death rate due to other miscellaneous causes of death in the early 1980s, the rate has significantly decreased since 1984. Rates of death from other infections and external causes remained relatively stable.

^a The categorization of causes of infant death is limited by the overlap between the perinatal and prematurity groups. A large portion of infants assigned to the perinatal category were born prematurely. Deciding whether the death of these infants was due primarily to their prematurity or to a complication in the perinatal period is imprecise, probably resulting in the classification of some infants whose deaths were due primarily to prematurity into the perinatal category.

**FIGURE 2.3: SIDS AS A CAUSE OF INFANT MORTALITY
KING COUNTY
1980-1995**



SOURCE: BIRTH AND DEATH CERTIFICATES.

The SIDS rate in King County dropped during 1991 and 1992 (Figure 2.3), when recommendations about sleep position and SIDS were brought to the attention of health providers and parents by local experts and the American Academy of Pediatrics.^b After the observed steep decrease in infant death from SIDS to 1992, the rate seems to have plateaued.

More awareness regarding sleep position is needed, especially emphasizing the new recommendation^c of the American Academy of Pediatrics (December, 1996)¹ which advises caregivers to put the infant to sleep on the back rather than either on the side or the stomach. Additionally, awareness regarding the harmful effects of tobacco smoke on the risk of death from SIDS deserves further emphasis.

3. CHANGING RISK FACTORS FOR INFANT MORTALITY IN KING COUNTY

The factors influencing infant mortality are complex and only partially understood. This section describes trends in risk factors for infant mortality. The effect of local programs and advances in medical science on infant mortality rates have been discussed in our previous report.²

A *risk factor* for infant mortality is a characteristic or condition that increases the chance that an infant will die. Many risk factors have been identified through epidemiological research.³⁻²⁵ The occurrence of an infant's death can be viewed as the consequence of a chain or web of multiple risk factors.

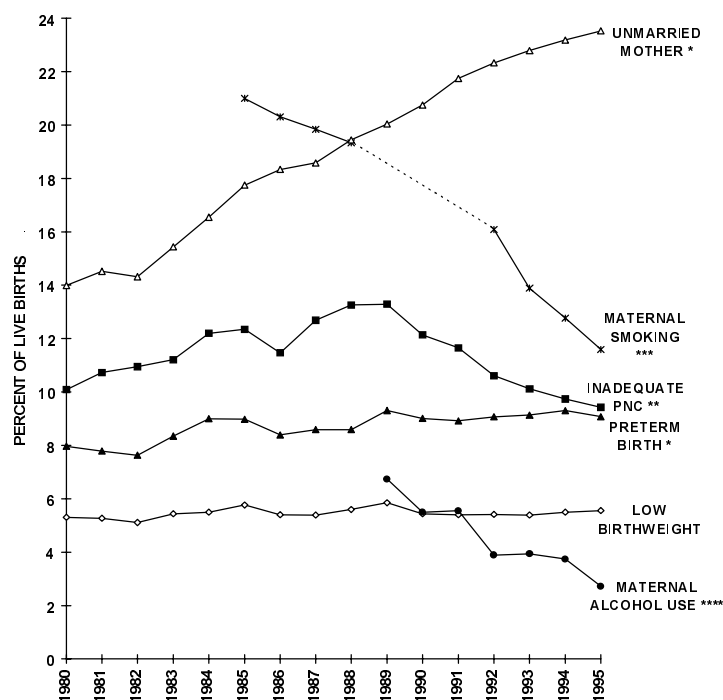
The risk factors considered in this section ("measured risk factors") are limited to those included on the birth certificate, the only currently available source of routinely collected risk factor data.^d Many other known risk factors remain unmeasured.

^b These recommendations suggest placing infants to sleep on either their backs or sides because of the increased risk of SIDS death associated with prone sleep position, i.e. placing infant on the tummy.

^c These recommendations suggest placing infants to sleep on their backs only because of the increased risk of SIDS death associated with other sleep positions, i.e. placing infant on the tummy or side.

^d In the near future, data from PRAMS (the Pregnancy Risk Assessment Monitoring System) will be available and will provide information on a broader range of risk factors for poor birth outcomes among pregnant women in Washington State as well as in King County.

**FIGURE 2.4: SELECTED BIRTH RISK FACTORS
KING COUNTY, 1980-1995**

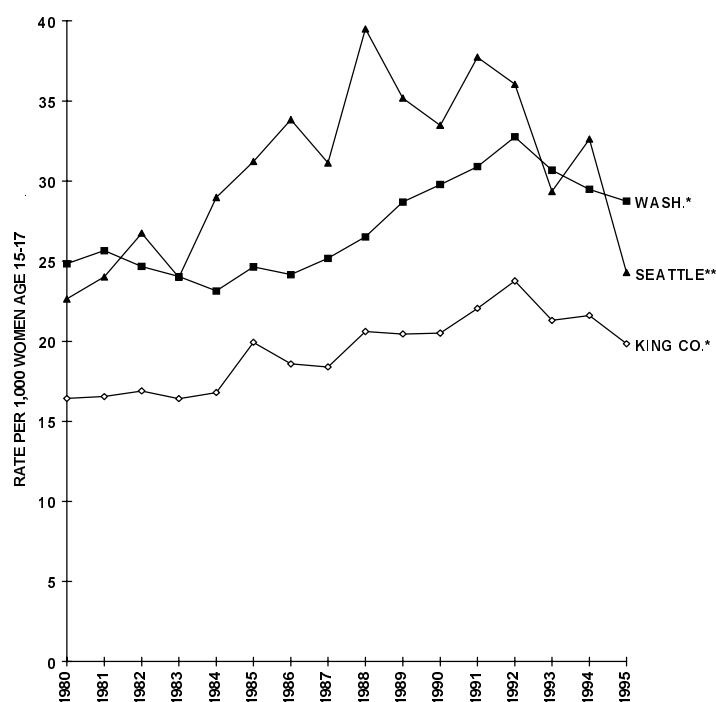


* THIS TREND FROM 1980-1995 IS A STATISTICALLY SIGNIFICANT INCREASE.
 ** THIS TREND FROM 1980-1989 IS A STATISTICALLY SIGNIFICANT INCREASE, AND FROM 1989-1995 IS A STATISTICALLY SIGNIFICANT DECREASE.
 *** THIS TREND FROM 1985-1995 IS A STATISTICALLY SIGNIFICANT DECREASE.
 **** THIS TREND FROM 1989-1995 IS A STATISTICALLY SIGNIFICANT DECREASE.
 SOURCE: BIRTH AND DEATH CERTIFICATES.

Among the measured risk factors data available from birth certificates, the rates of maternal smoking, maternal alcohol use and inadequate prenatal care continued to decrease in 1995, while the proportion of births to unmarried mothers continued to increase (Figure 2.4). The proportion of low birthweight births and preterm births remained steady.

While a portion of the decline in infant mortality is explained by changes in these measured risk factors, other important determinants of infant health are not routinely measured in vital statistics records. These include socio-economic conditions, other maternal behaviors, and social environmental factors which also have major influences on the infant mortality rate.

**FIGURE 2.5: BIRTHS TO ADOLESCENTS AGE 15-17
WASHINGTON, KING COUNTY, AND SEATTLE
1980-1995**



* THIS TREND FROM 1980-1992 IS A STATISTICALLY SIGNIFICANT INCREASE AND FROM 1992-1995 IT IS A STATISTICALLY SIGNIFICANT DECREASE.
 ** THIS TREND FROM 1980-1991 IS A STATISTICALLY SIGNIFICANT INCREASE AND FROM 1992-1995 IT IS A STATISTICALLY SIGNIFICANT DECREASE.
 SOURCE: BIRTH AND DEATH CERTIFICATES.

Infants born to adolescent mothers may be at higher risk of dying. While the proportion of all births occurring among adolescent mothers did not change, the adolescent birth rate has declined in recent years (Figure 2.5).²⁶

Many other unmeasured risk factors also influence the infant mortality rate, including:

- Lack of social support
- Stress
- Unintended pregnancy
- Illicit drug use
- Financial and non-financial barriers to health care
- Inadequate resources to cope with difficult life circumstances
- Lack of control over one's economic, physical and social environments.²⁷⁻²⁸

Changes in these unmeasured risk factors may have contributed to both the decline in infant mortality in low income areas as well as in the population as a whole. The Infant Mortality Review of King County collected information on some of these unmeasured factors, which were described in Chapters VI to VIII of our previous report,² but accurate population-based estimates of their prevalence and trends over time are unavailable.

SUMMARY

- The infant mortality rate in King County has continued to decline during the 1993-1995 period.
- The rate in Seattle may have leveled in the 1993-1995 period. Data for subsequent years is required before drawing any conclusions that the declining trend of recent years has ended.
- The leading causes of infant deaths in the 1993-1995 period in King County remain SIDS, perinatal conditions, congenital anomalies, and prematurity.
- The rates of maternal smoking, alcohol use and inadequate prenatal care continued to decrease in 1995, while the proportion of births to unmarried mothers continued to rise. The proportions of low birthweight births, preterm births and births to teen mothers remained steady.

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